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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/825,013	04/03/2001	Yasuhiko Morimoto	JP920000043	3853

7590 06/02/2004

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EXAMINER	
PHAM, HUNG Q	
ART UNIT	**PAPER NUMBER**
2172	

DATE MAILED: 06/02/2004 9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/825,013	Applicant(s) MORIMOTO ET AL.	
	Examiner HUNG Q PHAM	Art Unit 2172	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 April 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-23* is/are rejected.

7)☒ Claim(s) *14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 04/04/2004 have been fully considered but they are not persuasive.

(a) As argued by applicant on page 9, lines 13-23:

> *The present application on page 2, starting at line 1, references Koperski in its discussion of existing conventional spatial data mining system. The benefit of the invention over prior art is described on page 3, lines 19-25 of the specification as follow:*
> *Conventional data mining system can not, for example, cope with a search for "radius extending outward from a convenience store used to maximize the installation density of automatic teller machines within a unit distance in a district A or a search to ascertain the orientation of a route along which heavy air pollution spreads from a garbage disposal area.*

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

(b) As argued by applicant on page 9, lines 24-27:

> *The novel techniques as set forth in the independent claims of the present invention resolve the shortcomings of prior art by calculating a distance or an orientation requested by analyzation businesses, not by deriving a correlated spatial rule using distance or orientations calculated in advance, as disclosed in the prior art.*

Examiner respectfully traverses because of the following reasons:

As seen in the argument, applicant admitted that Koperski also disclose the claimed calculating a distance or orientations, but Koperski distance is calculated in advance, and the claimed invention technique of *calculating a distance or an orientation requested by analyzation businesses*. Firstly, examiner respectfully asks the applicant for an explanation of the difference between the claimed *calculating a distance* and the technique of calculating a distance of Koperski, because as in claims 1, 6, 11, 12, 15, 20, 21, 22 and 23, only *calculating a distance* either originating at a starting point or between a starting point and a query point is claimed. Secondly, the difference as pointed out by applicant, *requested by analyzation businesses*, was not mentioned in the claims, especially claims 1, 6, 11, 12, 15, 20, 21, 22 and 23. Thus, it is believed that the technique of calculating a distance as disclosed by Koperski meets the requirement of *calculating a distance* in claims 1, 6, 11, 12, 15, 20, 21, 22 and 23.

(c) Applicant's arguments on page 10 have been considered and respectfully traversed with the reasons as discussed above.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. **Claims 1-12, 15, 17 and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koperski et al. [Spatial Data Mining: Progress and Challenges Survey paper].**

Regarding to claims 1 and 20, Koperski teaches a spatial data mining method to discover interesting knowledge from spatial data, which are the data related to objects that occupy space. The spatial objects are stored in a spatial database and represented by spatial data types and spatial relationships among such objects (Introduction).

Spatial data can be described using two different properties, geometric and topological. For example, geometric properties can be spatial location (2. Methods for Knowledge Discovery in Spatial Databases). Koperski further discloses that various kinds of rules can be discovered from databases by mining the spatial data, such as spatial characteristic rule, spatial discriminant rule and spatial association rule (1.1.1 Primitives of Spatial Data Mining). As in Algorithm for Multiple Level Spatial Association Rules section, the mining process is started by a query, which is to describe a class of objects *S* using other task relevant classes of objects, and a set of relevant relations. For example, a user may want to describe parks as ***a provided starting point from database*** by presenting the description of relations between parks and other objects like: railways, restaurants, zoos, hydrological objects, recreational objects, and roads. Furthermore, the user can state that he/she is interested only in objects in the distance less than one kilometer from a park. The first step of the algorithm collects the task-relevant data. As seen, a query to discover the spatial characteristic rule within one kilometer from a park and other objects such as railway, restaurants, zoos… indicates ***a defined objective function that is examined in order to introduce said spatial rules***. Koperski does not explicitly teach the step of ***calculating a distance or an orientation block originating at said stating point or said starting point group in order to optimize said objective function that is defined***. However, in order to discover spatial rule as disclosed by Koperski, some efficient spatial computations are performed to extract spatial associations at the level of generalized spatial relations. These efficient computations look for objects whose minimal bounding rectangles are located in the distance no greater than the threshold to

satisfy the *close_to* predicate (Algorithm for Multiple Level Spatial Association Rules). As seen, in order to satisfy the one-kilometer threshold, obviously, ***a distance originating at*** the park as ***said starting point*** and other objects such as railway, restaurants, zoos… must be ***calculated***, in order to optimize the defined query of discovering the spatial rule. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Koperski method by including the step of calculating a distance in order to extract spatial rules relate to a query.

Regarding to claim 2, Koperski teaches all the claimed subject matters as discussed in claim 1, Koperski further discloses ***objective function is a function for which a distance or an orientation requested by an analyzation business is not provided*** (Mining Spatial Data Deviation and Evolution Rules).

Regarding to claim 3, Koperski teaches all the claimed subject matters as discussed in claim 1, Koperski further discloses the step of ***entering as input parameters the definition of a distance, the definition of said starting point or said starting point group and the definition of said objective function*** (FIG. 3-4 and Algorithm for Multiple Level Spatial Association Rules).

Regarding to claim 4, Koperski teaches all the claimed subject matters as discussed in claim 1, Koperski further discloses ***an intermediate table is generated based on starting point set data consisting of said starting point group and said objective function,***

and in accordance with distance values, attribute values for query points in said database are added together, based on said intermediate table (Algorithm for Multiple Level Spatial Association Rules, *Coarse_predicate_DB*).

Regarding to claim 5, Koperski teaches all the claimed subject matters as discussed in claim 1, Koperski further discloses the step of ***displaying on a map said distance or said orientation block relative to said starting point or said starting point group*** (FIG. 3-4).

Regarding to claims 6, 21 and 23, Koperski teaches a spatial data mining method to discover interesting knowledge from spatial data, which are the data related to objects that occupy space. The spatial objects are stored in a spatial database and represented by spatial data types and spatial relationships among such objects (Introduction). Spatial data can be described using two different properties, geometric and topological. For example, geometric properties can be spatial location (2. Methods for Knowledge Discovery in Spatial Databases). Koperski further discloses that various kinds of rules can be discovered from databases by mining the spatial data, such as spatial characteristic rule, spatial discriminant rule and spatial association rule (1.1.1 Primitives of Spatial Data Mining). As in Algorithm for Multiple Level Spatial Association Rules section, the mining process is started by a query, which is to describe a class of objects *S* using other task relevant classes of objects, and a set of relevant relations. For example, a user may want to describe parks as ***an employed set of starting point*** by

presenting the description of relations between parks and other objects like: railways, restaurants, zoos, hydrological objects, recreational objects, and roads. Furthermore, the user can state that he/she is interested only in objects in the distance less than one kilometer from a park as ***defining an orientation***. In other words, the technique as discussed illustrated the step of ***providing from said database a starting point or a starting point group***; ***employing said starting point or said starting point group to define an orientation***. The first step of the algorithm collects the task-relevant data. As seen, a query to discover the spatial characteristic rule within one kilometer from a park and other objects such as railway, restaurants, zoos... indicates ***a defined objective function that is examined in order to introduce said spatial rules***. Koperski does not explicitly teach the step of ***calculating a distance or an orientation block originating at said stating point or said starting point group in order to optimize said objective function that is defined***. However, in order to discover spatial rule as disclosed by Koperski, some efficient spatial computations are performed to extract spatial associations at the level of generalized spatial relations. These efficient computations look for objects whose minimal bounding rectangles are located in the distance no greater than the threshold to satisfy the *close_to* predicate (Algorithm for Multiple Level Spatial Association Rules). As seen, in order to satisfy the one-kilometer threshold, obviously, ***a distance originating at*** the park as ***said starting point*** and other objects such as railway, restaurants, zoos... must be ***calculated***, in order to optimize the defined query of discovering the spatial rule. Therefore, it would have been obvious for one of ordinary skill in the art at the time the

invention was made to modify the Koperski method by including the step of calculating a distance in order to extract spatial rules relate to a query.

Regarding to claim 7, Koperski teaches all the claimed subject matters as discussed in claim 6, Koperski further discloses ***objective function is a function for which a distance or an orientation requested by an analyzation business is not provided*** (Mining Spatial Data Deviation and Evolution Rules).

Regarding to claim 8, Koperski teaches all the claimed subject matters as discussed in claim 6, Koperski further discloses ***orientation block is obtained by employing the numerical value of said orientation used to optimize said objective function*** (FIG. 3-4).

Regarding to claim 9, Koperski teaches all the claimed subject matters as discussed in claim 6, Koperski further discloses ***a search objective data range, at equal distances from said starting point and from said starting point group, that is appropriate for calculating an orientation is selected as said orientation block*** (FIG. 3-4 and Algorithm for Multiple Level Spatial Association Rules).

Regarding to claim 10, Koperski teaches all the claimed subject matters as discussed in claim 6, Koperski further discloses the step of ***displaying on a map said distance or said orientation block relative to said starting point or said starting point group*** (FIG. 3-4).

Regarding to claims 11 and 22, Koperski teaches a spatial data mining method to discover interesting knowledge from spatial data, which are the data related to objects that occupy space. The spatial objects are stored in a spatial database and represented by spatial data types and spatial relationships among such objects (Introduction). Spatial data can be described using two different properties, geometric and topological. For example, geometric properties can be spatial location (2. Methods for Knowledge Discovery in Spatial Databases). As disclosed by Koperski, various kinds of rules can be discovered from databases by mining the spatial data, such as spatial characteristic rule, spatial discriminant rule and spatial association rule (1.1.1 Primitives of Spatial Data Mining). As in Algorithm for Multiple Level Spatial Association Rules section, the mining process is started by a query, which is to describe a class of objects *S* using other task relevant classes of objects, and a set of relevant relations. For example, a user may want to describe parks as ***a provided set of starting points*** by presenting the description of relations between parks and other objects like: railways, restaurants, zoos, hydrological objects, recreational objects, and roads as ***a provided set of query points in a database***. Furthermore, the user can state that he/she is interested only in objects in the distance less than one kilometer from a park as the step of ***designating an upper limit for a distance between said set of starting points and said set of query points***. Koperski does not explicitly teach the step of ***calculating a distance between each starting point and each query point***, ***calculating an angle formed between a starting point and a query point whose distance from said starting point does not exceed said designated upper limit***, and

generating a data table using said angle formed with said starting point. However, in order to discover spatial rule as disclosed by Koperski, some efficient spatial computations are performed to extract spatial associations at the level of generalized spatial relations. These efficient computations look for objects whose minimal bounding rectangles are located in the distance no greater than the threshold to satisfy the *close_to* predicate (Algorithm for Multiple Level Spatial Association Rules). Spatial orientations like *left_of, west_of* predicates also include in the method (2.3 Methods Exploring Spatial Associations). Koperski further discloses the generalized *g_close_to* predicates are stored in an extended relational database *Coarse_predicate_DB*. Every row of the *Coarse_predicate_DB* is a description of a single object from the class of objects being described. Description consists of objects, which satisfy task relevant predicates. For example, a row related to Stanley Park in Vancouver may include restaurant, zoo, main road, inlet, lake and other objects located inside the park or close to it (Algorithm for Multiple Level Spatial Association Rules). As seen, in order to satisfy the one-kilometer threshold, obviously, ***a distance originating at*** the park as ***said starting point*** and other objects such as railway, restaurants, zoos... as ***each query point*** must be ***calculated***, and obviously, an angle computations based on *left_of, west_of* predicates will perform ***between a starting point and a query point*** to satisfy the *close_to* predicate, or in other words, ***calculating an angle formed between a starting point and a query point***. *Coarse_predicate_DB* includes a data table generated based on the *close_to* predicate corresponding to the starting point, and obviously, a data table also based on an angle formed with starting point such as *left_of, west_of* according to the specified query of

objects in the distance less than one kilometer. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Koperski method by including the step of calculating a distance and angle, using spatial orientation to generate data table in the extended relational database *Coarse_predicate_DB* in order to extract spatial rules that relate to a direction.

Regarding to claim 12, Koperski teaches a spatial data mining method to discover interesting knowledge from spatial data, which are the data related to objects that occupy space. The spatial objects are stored in a spatial database and represented by spatial data types and spatial relationships among such objects (Introduction). Spatial data can be described using two different properties, geometric and topological. For example, geometric properties can be spatial location (2. Methods for Knowledge Discovery in Spatial Databases). Koperski further discloses that various kinds of rules can be discovered from databases by mining the spatial data, such as spatial characteristic rule, spatial discriminant rule and spatial association rule (1.1.1 Primitives of Spatial Data Mining). As in Algorithm for Multiple Level Spatial Association Rules section, the mining process is started by a query, which is to describe a class of objects *S* using other task relevant classes of objects, and a set of relevant relations. For example, a user may want to describe parks as by presenting the description of relations between parks and other objects like: railways, restaurants, zoos, hydrological objects, recreational objects, and roads. Furthermore, the user can state that he/she is interested only in objects in the distance less than one kilometer from a park. The first

step of the algorithm collects the task-relevant data. As seen, a query to discover the spatial characteristic rule within one kilometer from a park and other objects such as railway, restaurants, zoos… indicates ***an inputted objective function required for the optimization of a distance***. Koperski does not explicitly teach the step of ***employing in said database starting point data and query point data for calculating the distances between each starting point and each query point and generating an intermediate table***, and ***calculating a distance, based on said intermediate table, in order to optimize the value of said objective function that is entered***. However, in order to discover spatial rule as disclosed by Koperski, some efficient spatial computations are performed to extract spatial associations at the level of generalized spatial relations. These efficient computations look for objects whose minimal bounding rectangles are located in the distance no greater than the threshold to satisfy the *close_to* predicate (Algorithm for Multiple Level Spatial Association Rules). Koperski further discloses the generalized *g_close_to* predicates are stored in an extended relational database *Coarse_predicate_DB*. Every row of the *Coarse_predicate_DB* is a description of a single object from the class of objects being described. Description consists of objects, which satisfy task relevant predicates. For example, a row related to Stanley Park in Vancouver may include restaurant, zoo, main road, inlet, lake and other objects located inside the park or close to it (Algorithm for Multiple Level Spatial Association Rules). As seen, *Coarse_predicate_DB* includes a data table as ***intermediated table generated*** based on the *close_to* predicate corresponding to the starting point, and based on the *close_to* predicate in *Coarse_predicate_DB*, in order to satisfy the one-kilometer threshold,

obviously, ***a distance between*** the park as ***employed starting point in database*** and other objects such as railway, restaurants, zoos… as ***employed query point in database*** must be ***calculated***. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Koperski method by including the step of calculating a distance in order to extract spatial rules that relate to a direction.

Regarding to claim 15, Koperski teaches a spatial data mining method to discover interesting knowledge from spatial data, which are the data related to objects that occupy space. The spatial objects are stored in a spatial database and represented by spatial data types and spatial relationships among such objects (Introduction). Spatial data can be described using two different properties, geometric and topological. For example, geometric properties can be spatial location (2. Methods for Knowledge Discovery in Spatial Databases). Koperski further discloses that various kinds of rules can be discovered from databases by mining the spatial data, such as spatial characteristic rule, spatial discriminant rule and spatial association rule (1.1.1 Primitives of Spatial Data Mining). As in Algorithm for Multiple Level Spatial Association Rules section, the mining process is started by a query, which is to describe a class of objects *S* using other task relevant classes of objects, and a set of relevant relations. For example, a user may want to describe parks as by presenting the description of relations between parks and other objects like: railways, restaurants, zoos, hydrological objects, recreational objects, and roads. Furthermore, the user can state that he/she is interested only in objects in the distance less than one kilometer from a park. The first

step of the algorithm collects the task-relevant data. As seen, a query to discover the spatial characteristic rule within one kilometer from a park and other objects such as railway, restaurants, zoos… indicates ***an inputted objective function required for the optimization of an orientation***. Koperski further discloses spatial orientations like *left_of, west_of* predicates also include in the method (2.3 Methods Exploring Spatial Associations). The generalized *g_close_to* predicates are stored in an extended relational database *Coarse_predicate_DB*. Every row of the *Coarse_predicate_DB* is a description of a single object from the class of objects being described. Description consists of objects, which satisfy task relevant predicates. For example, a row related to Stanley Park in Vancouver may include restaurant, zoo, main road, inlet, lake and other objects located inside the park or close to it (Algorithm for Multiple Level Spatial Association Rules). As seen, ***based on starting point data and query point data in database,*** *left_of,* or *west_of* predicates as ***angles of 0 degrees from said starting points in a specific direction are employed to generate*** *Coarse_predicate_DB* as ***an intermediated table in which the orientation of the location of said query points are included***. Koperski does not explicitly teach the step of ***calculating, based on said intermediate table, an orientation for optimizing the value of said objective function that is entered***. However, in order to discover spatial rule as disclosed by Koperski, some efficient spatial computations are performed to extract spatial associations at the level of generalized spatial relations. These efficient computations look for objects whose minimal bounding rectangles are located in the distance no greater than the threshold to satisfy the *close_to* predicate (Algorithm for Multiple Level Spatial Association Rules). Spatial orientations like *left_of, west_of*

predicates also include in the method (2.3 Methods Exploring Spatial Associations). As seen, in order to satisfy the one-kilometer threshold, obviously, an ***orientation*** computations based on *left_of, west_of* predicates will perform ***between a starting point and a query point*** to satisfy the *close_to* predicate, or in other words, ***calculating an angle formed between a starting point and a query point***. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Koperski method by including the step of calculating an orientation in order to extract spatial rules that relate to a direction.

Regarding to claim 17, Koperski teaches a spatial data mining method to discover interesting knowledge from spatial data, which are the data related to objects that occupy space. The spatial objects are stored in a spatial database and represented by spatial data types and spatial relationships among such objects (Introduction). Spatial data can be described using two different properties, geometric and topological. For example, geometric properties can be spatial location (2. Methods for Knowledge Discovery in Spatial Databases). Koperski further discloses that various kinds of rules can be discovered from databases by mining the spatial data, such as spatial characteristic rule, spatial discriminant rule and spatial association rule (1.1.1 Primitives of Spatial Data Mining). As in Algorithm for Multiple Level Spatial Association Rules section, the mining process is started by a query, which is to describe a class of objects *S* using other task relevant classes of objects, and a set of relevant relations. For example, a user as ***an analyzation business*** may want to describe parks as by presenting

the description of relations between parks and other objects like: railways, restaurants, zoos, hydrological objects, recreational objects, and roads. Furthermore, the user can state that he/she is interested only in objects in the distance less than one kilometer from a park. The first step of the algorithm collects the task-relevant data. As seen, a query to discover the spatial characteristic rule within one kilometer from a park and other objects such as railway, restaurants, zoos... indicates ***an inputted objective function for which a distance or an orientation requested by an analyzation business is not provided*** by the user. Koperski does not explicitly teach the steps of ***employing starting point data and query point data in said database for calculating a distance between, or the orientation of each of the starting points with each of the query points, and calculating said optimal distance or said optimal orientation for the optimization of the value of said objective function***, and ***displaying, on the screen of a geographical information system, said optimal distance or said optimal orientation calculated by said optimal distance/orientation calculation means***. However, in order to discover spatial rule as disclosed by Koperski, some efficient spatial computations are performed to extract spatial associations at the level of generalized spatial relations. These efficient computations look for objects whose minimal bounding rectangles are located in the distance no greater than the threshold to satisfy the *close_to* predicate (Algorithm for Multiple Level Spatial Association Rules). As seen, in order to satisfy the one-kilometer threshold, obviously, ***a distance between*** the park as ***employed starting point data in database*** and other objects such as railway, restaurants, zoos... as ***employed query point data in database*** must be ***calculated***. And FIG. 3 and 4 illustrates the step of ***displaying, on the screen of a geographical information***

system, said optimal distance or said optimal orientation calculated. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Koperski method by including the step of calculating a distance in order to extract spatial rules that relate to a direction.

4. Claims 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koperski et al. [Spatial Data Mining: Progress and Challenges Survey paper] in view of Ester et al. [Clustering for Mining in Large Spatial Databases].

Regarding to claim 13, Koperski teaches all the claimed subject matters as discussed in claim 12, Koperski further discloses the step of ***employing query point data in said database to calculate distances between individual starting points and individual query points and to generate data records; and selecting an optimization function from among objective functions to be examined, and adding together record values, collected from said data records, that are required for optimization of each of said distances*** (Algorithm for Multiple Level Spatial Association Rules). Koperski fails to teach the step of ***preparing a Voronoi diagram by using said starting point data in said database***; and ***employing said Voronoi diagram*** to calculate distance. Ester teaches the technique of using voronoi diagram for spatial data mining technique (Clustering for Mining in Large Spatial Databases). Therefore, it would have been obvious for one of ordinary skill in the art at

the time the invention was made to modify the Koperski apparatus by using voronoi diagram to calculate distance in order to cluster data in a spatial database.

Regarding to claim 16, Koperski teaches all the claimed subject matters as discussed in claim 15, Koperski further discloses the step of ***employing query point data in said database to calculate distances between individual starting points and individual query points; calculating, based on said distances obtained, orientations of said starting points with said query points that fall within a designated distance upper limit, and storing said orientations as data records for said intermediate table; and selecting an optimization function from among objective functions to be examined, and collecting and adding record values, from said data records, that are required for optimization of each of said distances*** as discussed above. Koperski does not teach the step of ***preparing a Voronoi diagram by using said starting point data in said database; and employing said Voronoi diagram*** to calculate the distances. Ester teaches the technique of using voronoi diagram for spatial data mining technique (Clustering for Mining in Large Spatial Databases). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Koperski apparatus by using voronoi diagram to calculate distance in order to cluster data in a spatial database.

5. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koperski et al. [Spatial Data Mining: Progress and Challenges Survey paper] in view of Knorr et al. [Finding Aggregate Proximity Relationships and Commonalities in Spatial Data Mining].

Regarding to claim 18, Koperski teaches all the claimed subject matters as discussed in claim 17, but fails to disclose the step of ***using said optimal distance calculated for the display of circular areas, the centers of which are starting points***. Knorr teaches the technique of using circles and rectangles for displaying the features of spatial data. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Koperski technique by using circular areas to display the starting point in order to distinguish spatial information.

Regarding to claim 19, Koperski teaches all the claimed subject matters as discussed in claim 17, but fails to disclose the step of ***using said optimal orientation for the display of fan-shaped portions of said circular areas, the origins of said fan-shaped portions being said starting points at said centers of said circular areas***. Knorr teaches the technique of using circles and rectangles for displaying the features of spatial data. Krorr further discloses a feature can be any simple polygon. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Koperski technique by using a fan-shaped portion of circular areas to display the starting point in order to distinguish spatial information.

Allowable Subject Matter

6. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The closet available prior arts, Spatial Data Mining: Progress and Challenges Survey paper published by Koperski et al. in combined with the technique of Ester et al. (Clustering for Mining in Large Spatial Databases) also teaches a spatial data mining apparatus for calculating an optimal distance. However, Koperski and Ester fail to teach or suggest the technique of ***repeating plane quarter division in accordance with the number of starting points that are entered, sorts said starting points into end plane pixels obtained by division and selects one starting point in each of said end plane pixels as a representative point for the pertinent pixel, prepares a quaternary incremental tree with pixels at individual levels being defined as intermediate nodes, scans said individual nodes of said quaternary incremental tree in the breadth-first order, beginning at the topmost level, and outputs a set of starting points that are positioned in ranks.***

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q PHAM whose telephone number is 703-605-4242. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BREENE can be reached on 703-305-9790. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner Hung Pham
May 24, 2004

SHAHID ALAM
PRIMARY EXAMINER